FAA-E-2343
March 26, 1968

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION SPECIFICATION

SWITCHING SYSTEM, AUDIO AND CONTROL

1. SCOPE AND CLASSIFICATION

1.1 Scope.- The equipment described herein is an audio control system consisting of two separate panels Type I and Type II. The system is intended for installation at Flight Service Stations and Air Traffic Control Towers, and is to be used for transfer between main and standby transmitters or receivers.

1.2 Classification.-

Type I - Selector Switch Panel, Figure 1 and 3.4
Type II - Relay Transfer Panel, Figure 2 and 3.5

2. APPLICABLE DOCUMENTS

2.1 FAA specifications.- The following FAA specifications, of the issues specified in the invitation for bids or request for proposals, form a part of this specification:

FAA-D-1272	Instruction Booklets, Electronic Equipment
FAA-G-2100/1	Electronic Equipment, General Requirements; Part 1, General Requirements for all Equipments
FAA-G-2300	Panel and Vertical Chassis, Rack

(Copies of this specification and other applicable FAA specifications and drawings may be obtained from the Federal Aviation Administration, Washington, D. C. 20590, Attention: Contracting Officer. Requests should fully identify material desired, i.e., specification numbers, dates, amendment numbers, complete drawing numbers; also, requests should state the contract involved or other use to be made of the requested material.)

2.2 Military specification.- The following Military specification, of the issue in effect on date of the invitation for bids or request for proposals, forms a part of this specification and is applicable to the extent specified hereinafter:

MIL-E-17555 Electronic and Electrical Equipment and Associated Repair Parts, Preparation for Delivery of (Information on obtaining copies of Military specifications is given in Supplement-1 to FAA-G-2100/1).

3. REQUIREMENTS

3.1 Equipment to be furnished by the contractor.- Each Type I and Type II equipment furnished by the contractor shall be complete in accordance with all specification requirements. Instruction booklets shall be in accordance with FAA-D-1272. Both the Type I and Type II equipment shall be covered in one booklet. Quantities of instruction booklets shall be as called for in the contract schedule.

3.2 Ambient conditions.- The ambient conditions shall be those of Environment I (1-3.2.23, FAA-G-2100/1).

3.3 General.- Type I selector switch panel is usually mounted on a desk console in a vertical plane and moving the lever switch handle to the left supplies voltage to the indicator light of the Type I panel and the coil of the associated transfer relay in the Type II panel via control cable wiring. The control cable is not a part of this specification.

3.4 Type I equipment.- Type I equipment shall be as specified in paragraphs 3.4.1 to 3.4.10 below.

3.4.1 Construction.- The selector switch panel shall be constructed on a 3/16 inch aluminum panel, 1-31/32 $\pm$1/64 inches wide by 4-31/32 $\pm$1/64 inches high, with four mounting holes, spaced 1-1/2 inches between centers along top and bottom edges and 4-1/2 inches between centers along each side. The center of each hole shall be 15/64 inch from the adjacent edges. Holes shall be drilled with a #8 drill. Indicator lamps, switches, card holders and identification plate shall be mounted in positions similar to those shown in Figure 1.

3.4.2 Front panel finish.- The finish of the front panel shall be in accordance with FAA-G-2100/1, 1-3.8.2.

3.4.3 Chassis.- The chassis shall be constructed of nominal 0.063 inch aluminum stock in such a manner that upon insertion or removal of the connector plug there shall be no apparent flexing of the chassis.

protected. A direct short on the DC output shall not damage the rectifier components other than the fuse. There shall be noticeable hum or chatter in the relay due to ripple in the output.

3.5.2.1 Power source, AC.- The equipment shall operate from a single-phase two-wire AC line power source. The design-center voltage (1-3.2.21, FAA-G-2100/1) shall be 120 V. See FAA-G-2300 for AC connection.

3.5.2.2 Power source, DC.- The equipment shall operate from an external two-wire DC power source (not a part of the equipment covered by this specification). In modification of 1-3.2.21 to 1-3.2.23 of FAA-G-2100/1, the DC design-center voltage shall be 12 V; the normal test conditions tolerance shall be ±1 V; and the service conditions range shall be 10 V to 14 V. See Figure 2 for DC termination.

3.5.2.3 Fusing.- One fuse shall be located in the AC line input circuit, and a second fuse shall be located in the common +DC line.

3.5.2.4 DC grounding.- There shall be a resistance of 1 megohm (minimum) from both sides of the common DC line, with switch (3.5.2) set for external DC and for internal rectifier.

3.5.3 Relays.- The relays shall be keyed, plug-in types with individual dust covers. All relays shall be wired the same and provide a minimum of five form C palladium twin point contacts. The relay contacts shall use twisted shielded pair; all contacts shall be terminated on the chassis connectors. There shall be four relays on each relay transfer panel (Figure 2).

3.5.4 Coil dissipation.- The coil dissipation per relay shall not exceed 4.5 watts in continuous duty. The coil shall be unenergized on transfer to the main equipments.

3.5.5 Wiring.- The wiring shall be in accordance with FAA-G-2100/1 and Figure 3.

3.5.6 Finish.- The finish shall be in accordance with FAA-G-2100/1, 1-3.8.2.

3.5.7 Nameplate.- The nameplate shall be in accordance with FAA-G-2100/1. The equipment title shall be TRANSFER RELAY PANEL . The classification Type II (1.2) hereof shall not be marked on the nameplate.

3.5.8 Impedance.- The unit shall be designed to operate with 600 ohm audio circuits of up to 5 watts.

3.5.9 Channel isolation.- With an input signal of 1000 Hz, 10.0 volts applied to the input of one audio channel, the signal as measured in the output of all other channels shall not exceed a level of -38 dBm when terminated with 600 ohm ±5% non-inductive resistors. This requirement applies to both main and standby audio portions of the system.

3.4.4 Nameplate.- The nameplate shall be in accordance with FAA-G-2100/1, 1-3.13, reduced in size, and mounted in a position similar to that shown in Figure 1. The equipment title shall be SELECTOR SWITCH PANEL . The classification Type I (1.2) hereof shall not be marked on the nameplate.

3.4.5 Card holders.- Four metal card holders approximately 7/8 inch long by 1/4 inch wide with clear transparent plastic windows and white cards shall be mounted on the front panel in positions similar to those shown in Figure 1. The finish shall be the same as the front panel. Facilities shall be incorporated to allow easy removal and replacement of the card and window without removing the holder.

3.4.6 Identification plate.- An identification plate shall be mounted on the front panel. In material, method of marking and general appearance it shall be the same as the standard nameplate but shall carry only the type designation (3.4.4) and serial number of the equipment. In mounting, it shall be in a position similar to that shown on Figure 1. Dimensions of the identification plate shall be approximately 1-1/4 inches long by 1/4 inch wide. The design shall be submitted with that of the nameplate for approval.

3.4.7 Indicator lamps.- Four each indicator lamps with red jewels shall be mounted on the front panel in positions similar to those shown on Figure 1.

3.4.8 Switches.- Four each lever key switches shall be mounted on the front panel in positions similar to those shown on Figure 1. Switches shall be mounted in such a position so that the switches are thrown in a horizontal plane from right to left.

3.4.9 Connector socket and plug.- The connector socket and plug shall be a latched type with keyed shell mounted on the rear of the chassis similar to that shown on Figure 1.

3.4.10 Marking on front panel.- The switches shall be marked with appropriate M and S as shown on Figure 1.

3.5 Type II equipment.- The Type II equipment shall be as specified in paragraphs 3.5.1 through 3.5.10.

3.5.1 Construction, relay transfer panel.- The relay transfer panel shall mount on a standard rack panel no larger than Size C. The panel and chassis shall be in accordance with FAA-G-2300 Type I. The nameplate, AC/OFF/DC switch, fuses, and indicator light shall be front-panel mounted. The connectors and relays shall be mounted on the rear of the chassis. The rectifier power supply components shall be mounted inside the chassis.

3.5.2 Electrical.- The relay transfer panel shall be capable of operating from two power sources, AC and DC, with a means of selecting the operation desired by means of a toggle switch (4PDT center off). The panel shall have a built-in solid state rectifier capable of supply continuous full load equipment power requirements when switched to the AC power source. The rectifier shall be transformer isolated from the AC source and fuse

3.5.10 Hum pickup.- With the AC power supply in operation feeding the common DC circuit and with all audio output circuits terminated with 600 ohm ±5% non-inductive resistors, the total hum and noise pickup as measured in each of the output circuits shall not exceed a level of -50 dBm.

3.6 System operation.- All switches, relays, and indicator lights shall function properly when connected in accordance with Figure 3.

3.7 Functions of a single circuit transfer.- A simplified drawing showing the circuitry involved in the transfer of a single channel, audio and control portion, shall be included in the Instruction Booklet.

4. QUALITY ASSURANCE PROVISIONS

4.1 Design qualification tests.- The following design qualification tests shall be made under normal test conditions:

Electrical	3.5.2, 3.5.2.1*, 3.5.2.2*, 3.5.2.4
Coil dissipation	3.5.4**
Channel isolation	3.5.9
Hum pickup	3.5.10**

*Minimum AC & DC service conditions voltages
**Maximum AC & DC service conditions voltages

4.2 Production tests.- The following production test shall be made.

System operation	3.6

5. PREPARATION FOR DELIVERY

5.1 General.- See MIL-E-17555.

6. NOTES

6.1 None.

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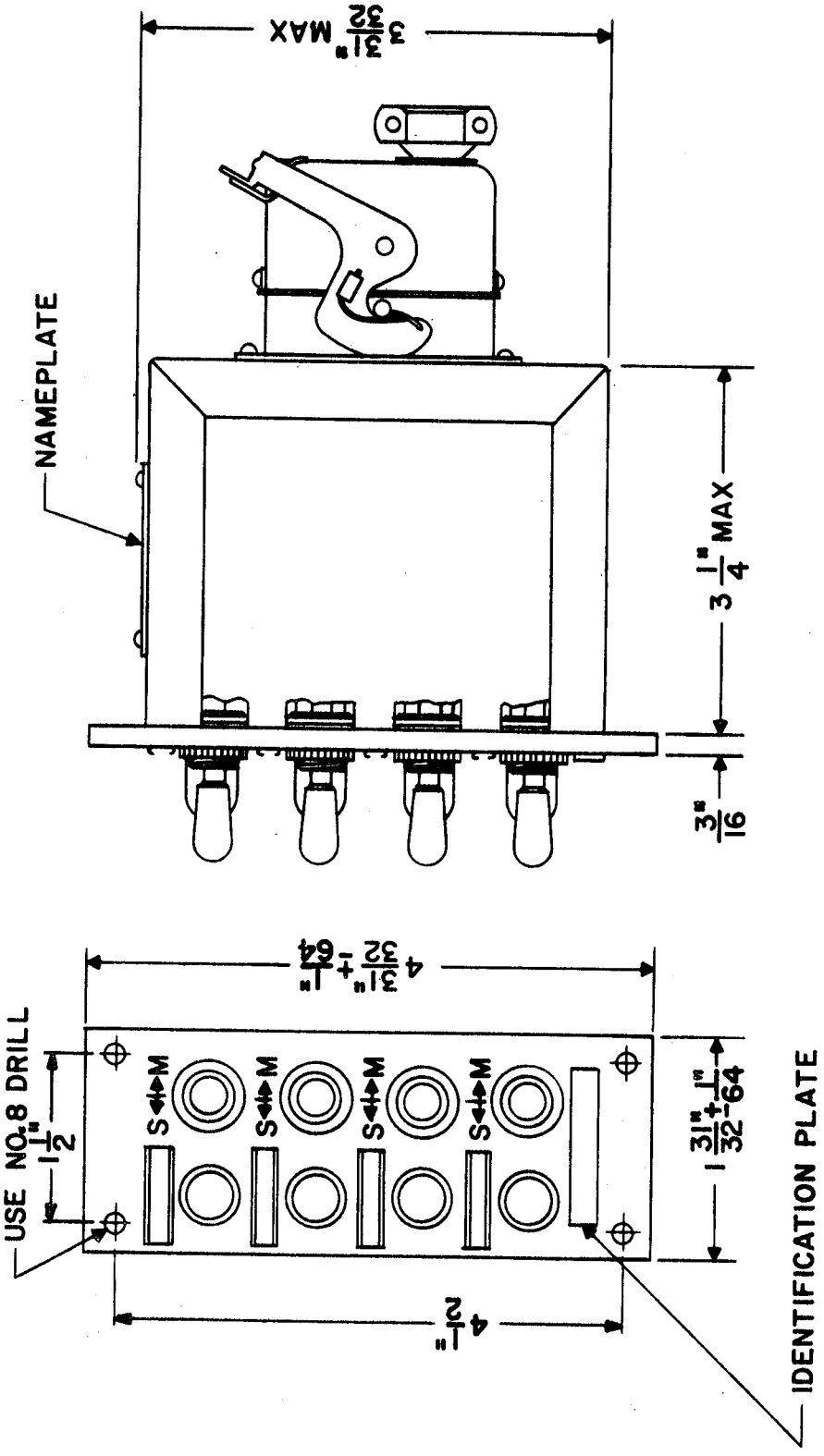
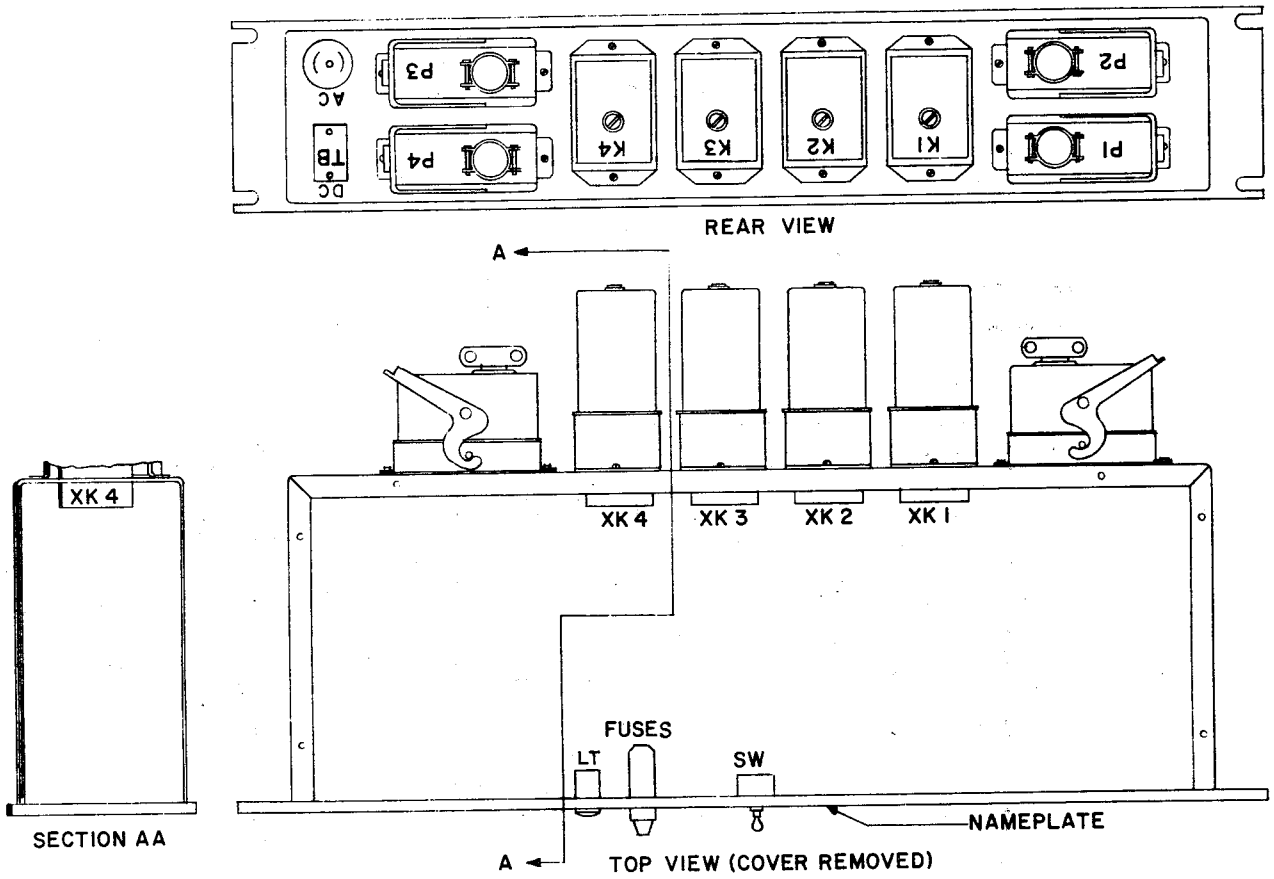
ATTACH: Figures 1, 2, and 3, see pages 6, 7, and 8.



SELECTOR SWITCH PANEL
FIGURE I

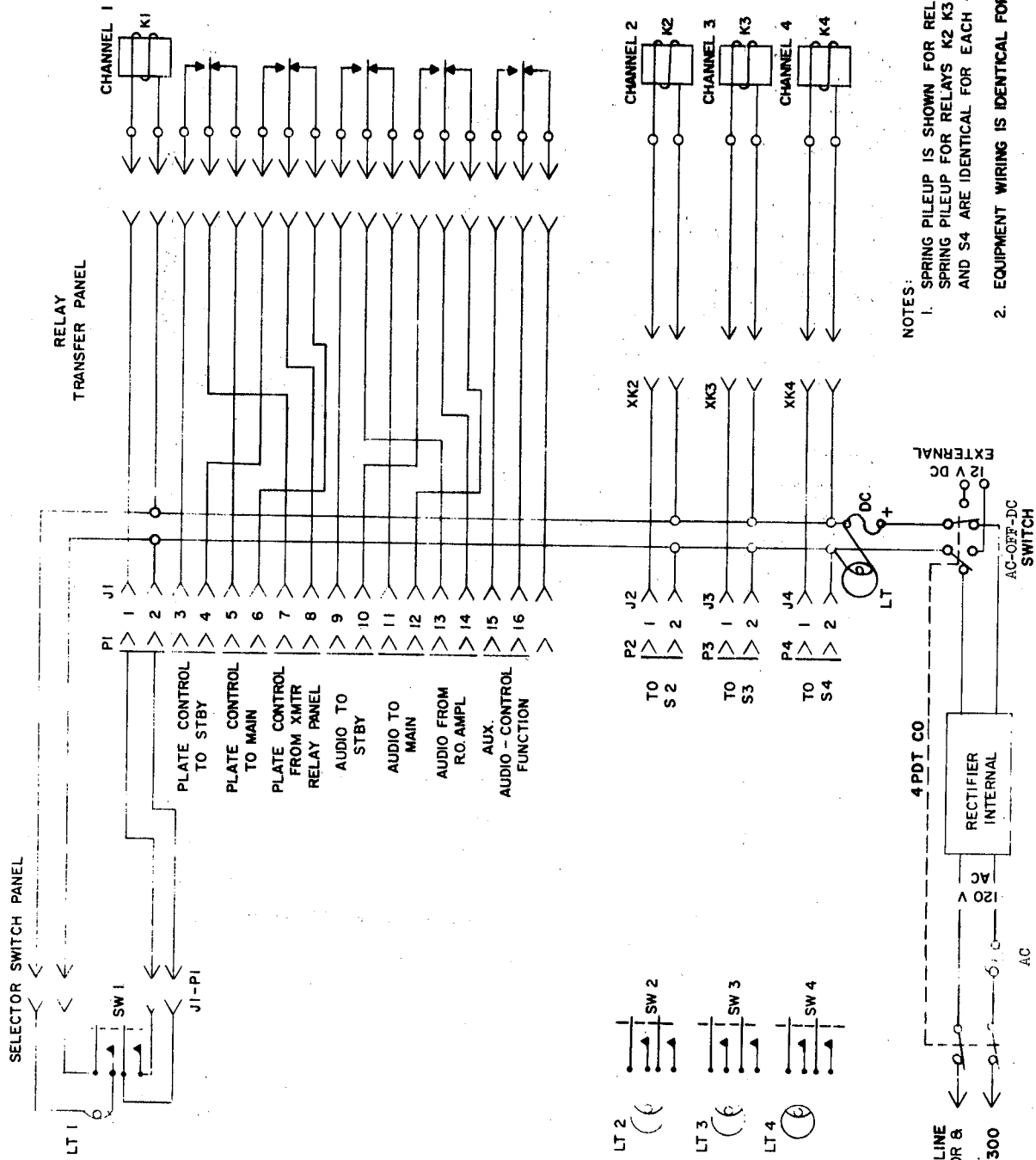
S – STANDBY
M – MAIN



NOTE:
1. PARTS LOCATIONS ARE RELATIVE. (DO NOT SCALE.)

RELAY TRANSFER PANEL
FIGURE 2

FILE: B15063-1



NOTES:
1. SPRING PILEUP IS SHOWN FOR RELAYS K1 AND S1 SPRING PILEUP FOR RELAYS K2 K3 AND K4, S1 S2 S3 AND S4 ARE IDENTICAL FOR EACH CHANNEL.
2. EQUIPMENT WIRING IS IDENTICAL FOR EACH CHANNEL.

FIGURE 3

FILE: B15063-2